

# Pediatric Plastic Surgery

## Brachial Plexus Birth Injuries

### **What is the brachial plexus?**

The brachial plexus is a complex network of nerves between the neck and shoulders. These nerves control muscle function in the chest, shoulder, arms and hands, as well as sensibility (feeling) in the upper limbs.

### **What is brachial plexus birth palsy (BPBP)?**

Brachial plexus birth palsy is an injury to the brachial plexus nerves that occurs during childbirth. The nerves of the brachial plexus may be stretched, compressed or torn during a difficult delivery. The result might be a loss of muscle function or even paralysis of the upper arm. Injuries may affect all or only a part of the brachial plexus.

### **What happens during childbirth to cause an injury to the brachial plexus?**

During childbirth, stress can occur across a baby's neck and head area, injuring the nerve(s). This stress usually happens when the head goes in one direction and the shoulder goes in another direction.

### **Can injury to the brachial plexus nerve network happen in other circumstances than childbirth?**

Yes, a traumatic brachial plexus injury can occur at any age – often as a result of a sports injury or car or work accident.

### **How common is brachial plexus birth palsy?**

Brachial plexus birth palsies occur in about one to three out of every 1,000 births.

### **What are the risk factors for brachial plexus birth palsy?**

Risk factors for sustaining brachial plexus birth palsy include: Large gestational size; breech birth; prolonged or difficult labor; vacuum- or forceps-assisted delivery; twin or multiple pregnancy; or a history of a prior delivery resulting in brachial plexus birth palsy.

### **How is brachial plexus birth palsy diagnosed?**

Brachial plexus birth palsy can be diagnosed by your baby's pediatrician or a brachial plexus specialist upon a thorough medical history and physical examination. Since the majority of babies with a brachial plexus injury recover in the first month to six weeks after they are born, these exams may be all they need.

In addition to a physical exam, doctors may conduct special imaging studies like an MRI or nerve conduction studies, although for babies, these tests are not as reliable as they are for adults and require anesthesia. If doctors suspect that your child also has a fracture, they may take an X-ray, too. It is important to find an experienced doctor who will be able to track your child's progress over repeated exams.

## Does brachial plexus birth palsy cause the baby pain?

Usually, the baby is not in much pain despite their BPBP, probably because infants' nerves behave differently from adults'. Approximately 4% seem to experience severe pain. If a fracture accompanies the BPBP, the baby will experience some discomfort from the fracture, but not usually intense pain. And any fractures (clavicle, humerus) the baby may have will probably heal quickly – in about 10 days.

This is in contrast to an adult's traumatic brachial plexus injury caused by accident or sports impact: In these cases, pain from BP injury is acute and disabling, as is pain from any accompanying fractures.

## What are the treatments for brachial plexus birth injury?

**Observation:** Most brachial plexus birth palsies will heal on their own. Your doctor will monitor your child closely. Many children improve or recover by 3 to 12 months of age. During this time, ongoing exams should be performed to monitor progress.

**Physical therapy and/or occupational therapy:** Therapy is recommended to help maximize use of the affected arm and prevent tightening of the muscles and joints. With the teaching and guidance of therapists, parents learn how to perform range of motion (ROM) exercises at home with their child several times a day. These exercises are important to keep the joints and muscles moving as normally as possible.

**Botox injections:** These injections may be used (mainly for the shoulder) to help with joint motion, rebalancing muscles, preventing contractures and shoulder dislocations.

**Surgery:** Children who continue to have problems three to nine months after birth may benefit from surgical treatment. There are several surgical options, including microsurgery to repair or reconstruct the injured nerves, tendon transfers, muscle transfers or joint surgery.

## What are the possible complications after surgery?

Complications after surgery are uncommon but can occur, and can be either temporary or permanent. These include stiff joints that can be treated with occupational therapy, pain from nerve damage (very unlikely), muscle atrophy due to incomplete recovery and disability from incomplete recovery. The biggest risk with surgery for brachial plexus birth injury is that the arm and hand will not get as close to normal as hoped.

## What is the prognosis if my child has brachial plexus birth palsy?

The prognosis is dependent on the extent of the injury, and for this reason, it varies from patient to patient.

- The good news is that either spontaneously or with therapy, most of our young patients recover fully or nearly fully by the time they are 6 to 12 months old. Some may even begin to recover when they are just 6 weeks old. Less than half of children with BPBP will need nerve surgery.
- If needed, your child's rehabilitation team will work with you and your child to learn home exercises that are important to her recovery. Most parents perform range of motion (ROM) exercises at home with their child many times a day for several years. These exercises are important for keeping the joints and muscles moving as normally as possible.
- If a child does not recover fully, surgery can improve her strength and/or motion and help optimize shoulder joint development.
- One of the common problems with brachial plexus birth palsies can be the abnormal development of the child's shoulder joint, which can happen over time. So, in addition to physical examinations, your child may need ultrasound, magnetic resonance imaging (MRI) and/or computed tomography (CT) scans to monitor his shoulder development.

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